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When Size Matters: Sensitivity to Missed Opportunity Size Increases with Stronger  
Assessment

Frank Mathmann<sup>a\*</sup>, E. Tory Higgins<sup>b</sup>, Mathew Chylinski<sup>c</sup> and Ko de Ruyter<sup>d</sup>

<sup>a</sup> School of Advertising, Marketing and Public Relations, QUT Business School, Queensland  
University of Technology; <sup>b</sup> Department of Psychology, Columbia University; <sup>c</sup> School of  
Marketing, Australian School of Business, University of New South Wales; <sup>d</sup> Cass Business  
School, City University London

Author Note

Correspondence concerning this article should be addressed to Frank Mathmann,  
Queensland University of Technology, GPO Box 2434, Brisbane Qld 4001, Tel.: +31 6 21 94  
28 83, [f.mathmann@gmail.com](mailto:f.mathmann@gmail.com)

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### Abstract

This research shows that the strength of assessment orientation, defined as the “aspect of self-regulation concerned with critically evaluating entities or states” (Kruglanski et al., 2000, p. 794), increases a person’s sensitivity to the size of a missed opportunity. Study 1 revealed that the experimental induction of an assessment orientation reduced the likelihood to act on a present offer after missing out on a large opportunity. Following a small missed opportunity, on the other hand, seizing the present offer was more likely. Studies 2 and 3 generalized this effect to chronic assessment orientations. In Study 4 the findings were replicated in a field study, which also demonstrated that differential value judgments explain assessors’ sensitivity to the size of a missed opportunity.

*Keywords:* inaction inertia, missed opportunity size, assessment, regulatory mode, decision-making

### When Size Matters: Sensitivity to Missed Opportunity Size Increases with Stronger Assessment

The popularity of time-based offers on digital platforms such as Groupon, eBay, and Kayak have increased customer exposure to highly attractive deals. Inevitably, when customers find time to act on an opportunity it will have expired or all available products will have sold. Missing out in this way has substantial consequences for individuals who attempt to evaluate their options in detail. Particularly when the missed opportunity is greater in size, it can have lasting negative effects (Tsiros, 2008). For example, people who miss a Groupon sign-up special for the fitness center near their homes might fail in their New Year's resolution to exercise, others might abandon Saturday night plans because they missed a two-for-one dinner deal, and others still might skip a holiday if they don't get a 50% early booking bonus for a hotel reservation. Missing out on a 20% deal might be fine, for example, but losing a 50% discount can prompt travelers to forgo the entire trip.

Similarly, time-based offers also result in large missed opportunities for income. Increasingly common digital platforms present a wide variety of opportunities for on-demand work, where participants miss out on the most attractive opportunity if they don't respond on the spot. For instance, in the past, yellow cab drivers might not have become discouraged to work the next day if they missed out on \$20 the night before. However, with time-based pricing, platforms such as Uber can dramatically adjust salaries to meet demand, with the result that workers regularly miss out on a doubling or tripling of their salary, leading to broad worker demotivation (Chen, 2016). Yet, despite the increasing importance of this phenomenon, little research has been conducted to develop a broader understanding of the underlying psychological mechanisms that cause such demotivation after a large missed opportunity. We anticipate that individuals who actively compare options in their effort to make the right decision—individuals with a strong assessment orientation—are more prone

to such demotivation after a large missed opportunity.

This seemingly irrational behavior, from an economic perspective, perplexes economists and psychologists alike. Research in this area consistently shows that the bigger the missed opportunity, the lower the likelihood of subsequent action (Arkes, Kung, & Hutzel, 2002; Kumar, 2004; Pittman, Tykocinski, Sandman-Keinan, & Matthews, 2008; Tsiros, 2008; Tykocinski, & Pittman, 1998; Tykocinski, Pittman, & Tuttle, 1995; van Putten, Zeelenberg & van Dijk, 2007, 2008, 2009; Zeelenberg, Nijstad, van Putten, & van Dijk, 2006). For instance, a recent review on the effects of missed opportunities acknowledges that their size is the most important driver for action on a subsequent offer (van Putten, Zeelenberg, van Dijk & Tykocinski, 2014). This acknowledgment is grounded in a wealth of empirical support. Small missed opportunities have largely been found not to affect acceptance of follow-up offers, while large missed opportunities have resulted in a significant decrease in acceptance (e.g. Tykocinski et al., 1995). However, there is still a need to better understand when, for whom, or why the size of a missed opportunity matters. Thus, the boundary conditions and underlying mechanisms of this effect still need to be studied further. We contribute to this literature by showing that people with a strong assessment orientation are much more prone to this effect than others. By focusing on psychological states and individual differences that sensitize people to the size of a missed opportunity, this research shows that people respond very differently to the size of a missed opportunity depending on their self-regulatory predisposition. Crucially, we illustrate that small and large missed opportunities do not universally affect all individuals to the same degree.

In addition, the current research also considers multiple alternative mechanisms to explain an assessor's tendency to disengage after a large missed opportunity. Evidence is presented for the mediating role of value judgments, which reflect an experience of attraction towards a stimulus, such as a product or a work opportunity (Higgins, 2006). More

specifically, in Study 4 we demonstrate that people with a stronger assessment orientation are more likely to devalue the present offer after missing out on a large one. This explains why they neglect an offer in the present following a very attractive missed option. In the following section we discuss the current state of knowledge about the effect of large vs. small missed opportunities in a brief review of the inaction inertia literature.

### **Inaction Inertia and Missed Opportunity Size**

Inaction inertia “occurs when bypassing an initial opportunity has the effect of decreasing the likelihood that subsequent similar action opportunities will be taken” (Tykocinski et al., 1995, p. 794). The size of a missed opportunity has been identified as the crucial determinant for accepting a present offer (Tykocinski et al., 1995; van Putten et al., 2014). For example, whether a vacation offer is judged as valuable depends on the size of the vacation discount that a traveler just missed out on. These reactions to missed opportunity size are very robust and have been found in several studies across decades (Arkes et al., 2002; Kumar, 2004; Pittman et al., 2008; Tsirios, 2008; Tykocinski & Pittman, 1998; Tykocinski et al., 1995; van Putten et al., 2007, 2008, 2009; Zeelenberg et al., 2006).

For instance, Tykocinski et al. (1995, Experiment 2) demonstrated that a large (as opposed to small or no) missed opportunity results in a decreased acceptance of subsequent offers. They experimentally manipulated missed opportunity size by randomly assigning individuals to a small, large, or no missed opportunity. They subsequently asked them to indicate their likelihood of accepting a second, less attractive choice (or the first in the case of the control group). Specifically, they asked participants to imagine that they were interested in joining a new fitness center. A third of the participants received the information that this fitness center was 5 minutes from their house (large missed opportunity condition). Another third of the respondents were informed that the distance was 25 minutes (small missed

opportunity condition). The final third did not receive any information about a missed opportunity. Next, all participants were instructed to imagine that they had missed the deadline to sign up for the fitness center. They were then asked to indicate their likelihood to sign up for a gym that was 30 minutes from their home, and thus less attractive. The results showed that individuals reported a lower likelihood of joining the second fitness center if they had missed out on the one that was 5, as opposed to 30, minutes away. There was no difference between the group that had missed out on the small opportunity and the control group. Thus, the effect of a missed opportunity on the decreased acceptance of subsequent offers depends on the size of the missed opportunity.

Similar findings have been reported in the literature about decision evaluation (Baron & Hershey, 1988; Seta, Seta, Petrocelli & McCormick, 2015), where a large missed opportunity has been found to negatively influence evaluations of decision quality (Seta et al., 2015). Investment decisions that resulted in high (*vs.* low) profit were judged as lower in quality when the size of more attractive forgone payoffs was high (*vs.* low). Taken together, these findings highlight the importance of missed opportunity size.

Yet, while considerable research has investigated when and for whom a missed opportunity influences judgment and decision-making (for a good review see van Putten et al., 2014), little is known about when or for whom the *size* of a forgone opportunity matters. Thus, to extend this literature, we investigate how motivation to critically compare a missed and a present opportunity heightens a person's sensitivity to the size of the missed opportunity. This sensitivity manifests in greater acceptance of the present offer when only a small opportunity is missed and decreases acceptance after missing a large opportunity. People who want to make the right decisions, and thus are oriented toward making critical comparisons, care about what exactly they just missed out on, rather than simply noticing a missed opportunity. With this postulation, we extend current understanding by focusing on

the motivational state and individual differences that create sensitivity to the size of the missed opportunity. Regulatory mode theory provides a useful perspective in this context. It uniquely enables us to investigate the effects of a motivation to compare (assessment orientations) in terms of (1) temporary states, as well as (2) stable individual differences, while (3) separating the effects of this orientation from those of the desire to just get on with things (locomotion).

### **Regulatory Mode**

Regulatory mode theory (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000; Pierro, Presaghi, Higgins, Klein, & Kruglanski, 2011) proposes assessment and locomotion as two distinct functions of self-regulation. Assessment “constitutes the comparative aspect of self-regulation concerned with critically evaluating entities or states, such as goals or means, in relation to alternatives in order to judge relative quality” (Kruglanski et al., 2000, p. 794). Individuals with an assessment orientation want to make the right decision (Higgins, 2012). Thus, they are strongly motivated to compare options against reference points before making a decision (Avnet & Higgins, 2003). Locomotion, in contrast, “constitutes the aspect of self-regulation concerned with movement from state to state and with committing the psychological resources that will initiate and maintain goal-related movement in a straightforward and direct manner, without undue distractions or delays” (Kruglanski et al., 2000, p. 794). They want to just “get on with it.” Locomotion and assessment orientations can be differentially emphasized by individuals, either momentarily induced in a particular situation or chronically as a personality disposition (Avnet & Higgins, 2003; Kruglanski et al., 2000). With regulatory mode theory we can test for the effects of these two orientations *separately* on people’s considerations of a missed opportunity as they make decisions in the present. We propose that, in terms of sensitivity to the size of a missed opportunity, only the strength of the assessment orientation is relevant, because this



orientation specifically pertains to evaluating present actions in light of past reference points, such as the size of a missed opportunity.

### **Assessment Orientations and Missed Opportunity Size**

People with strong assessment orientations may be more sensitive to the size of a missed opportunity when they consider an offer in the present. Assessors have a strong orientation to make the right choice, and making comparisons helps them to do so (Kruglanski et al., 2000). Comparisons require reference points. The literature suggests that the effect of missed opportunity size in part may result from how a person settles on a past opportunity as the reference point for the evaluation of a subsequent offer (Arkes et al., 2002; van Putten et al., 2014; Zeelenberg et al., 2006). Research on regulatory mode theory supports this reasoning, showing that people who have a chronically strong (vs. weak) assessment orientation are more likely to use representations of significant others in their lives as a reference point when forming impressions of new people (Pierro, Orehek, & Kruglanski, 2009). In line with this literature, we infer that when considering an offer after a better opportunity has been missed assessors in particular will use the previous opportunity as a reference point against which to compare the present offer. A reference point allows a relative comparison; hence, for assessors the size of the past opportunity is more important. By considering closely the size of the missed opportunity (how far the present offer is from the reference point based on the previous opportunity) when forming their judgment, assessors may be more sensitive to this reference point. That is, they are more likely to determine their course of action based on the reference point they just missed. Missing out on a small opportunity may not elicit inaction on an offer in the present, whereas a large missed opportunity is likely to elicit inaction. Therefore, we formulate Hypothesis 1 as follows:

**H1:** Individuals with a strong (vs. weak) assessment orientation are more likely to neglect offers in the present after a large (vs. small) opportunity has been missed.

Previous inaction inertia research has explained the effect of the size of a missed opportunity in terms of devaluation of a present offer (Arkes et al., 2002; Zeelenberg et al., 2006). This account is built on the well-established idea that people utilize information about previous opportunities such as selling prices of products as a reference point in judging the value of an offer in the present (Burger, 1986). For instance, customers deem products that have been offered with promotional rewards (e.g. a free extra product) as less valuable than identical items without rewards (Forehand, 2000). Likewise, when customers consider the purchase of a Holiday (as in our Experiments 1 and 2) after learning that it was previously offered together with a gift, they might conclude that it is not worth the full cost. In other words, people devalue the current offer as they think that the cost (monetary or not) is above the actual value of the offer (“Why else was the previous opportunity so much better?”). Thus, according to this account, when facing a future offer, people think that the cost does not match its value and neglect it.

We argue that the devaluation of the present offer based on the size of the missed opportunity holds especially for high assessors because they are motivated to compare. They judge the present offer by comparing it in detail against the size of the past opportunity. Doing so, they are better at noticing whether a missed opportunity was small or large. This allows them to more effectively allocate value to a new offer. When a missed opportunity is small, attraction towards the new offer is higher than when the missed opportunity is large, and the motivation to act follows the greatest attraction. We expect that judgments of value, say that of a product, service or work offer, in fact, may be the reason for inaction; that is, assessors who are particularly sensitive to the size of the missed opportunity will place a

different value on a current offer after a small versus large missed opportunity has passed; which is why they may act differently. Therefore, we propose:

**H2:** Individuals with a strong (vs. weak) assessment orientation are more likely to base their value judgment of a present offer on the size of a missed one.

**H3:** Differential value judgments explain why individuals with a strong (vs. weak) assessment orientation neglect an offer in the present after a large (vs. small) opportunity has been missed.

While previous literature provides strong support for the indirect effect through value judgments that we outlined above (Arkes et al., 2002; Zeelenberg et al., 2006), at least three alternative explanations can also be derived from previous research. The first possibility is that assessors may polarize their *perceptions* of differences between the past and present opportunities; that is, rather than basing their judgment of value on the size of the missed opportunity, assessors alter their *perceptions* of opportunity differences. An assessor might perceive a small missed opportunity as “similar” to the present offer, and a large missed opportunity as “different” to it. This may polarize perceptions of differences between the options. Individuals with a low assessment orientation, on the other hand, pay less attention to the differences and thus might not experience them as strongly or not at all. Following this logic, when the perceived opportunity difference is small, assessors would be more likely to act on the present offer. However, when the options are perceived as different, the likelihood of taking the present offer declines. Although this account is reasonable the literature provides little support for it. Numerous studies have illustrated that assessment affects comparisons (e.g., Mathmann, Chylinski, de Ruyter & Higgins, in press) but, to our knowledge, no study has supported assessment as a driver for perceptual bias, which is not

surprising given assessment is an inclination for accurate decision-making (Kruglanski et al., 2000).

A second possible explanation builds on the concept of *experienced* regret. A large missed opportunity might be experienced as a failure, and that produces counterfactual thinking which results in regret (Seta et al., 2015; Zeelenberg et al., 2006). In the context of regulatory mode theory, experienced regret might be pertinent because strong assessment orientations have been found to increase counterfactual thinking and regret (Pierro et al., 2008). The effect of this increase in regret on the acceptance of a subsequent offer is less clear, however (van Putten et al., 2014; Zeelenberg et al., 2006). On the one hand, declining an offer in the present after missing out on a previous opportunity can be seen as an attempt to end the unpleasant experience of regret (Tykocinski & Pittman, 1998). Thus, according to this thinking, regret should motivate rejection of the following option. On the other hand, increased regret might also result in a desire to correct a previous mistake of forgoing the purchase (Patrick, Lancellotti, & Demello, 2009), thus resulting in acceptance of the follow-up option. This ambiguity about the potential effects of regret is consistent with empirical tests and recent reviews that have cast doubt on regret as an explanatory factor for missed opportunity size effects (van Putten et al., 2014; Zeelenberg et al., 2006). Hence, even though plausible, there is increasing doubt about the role that regret plays as an explanatory factor.

Instead, a stronger case is made by some literature for *anticipated* regret. Anticipated regret and prefactual thinking play an important role in decision-making (Petrocelli, Seta, & Seta, 2012). In the context of missed opportunity size, individuals who missed a small (vs. large) opportunity would anticipate more regret about missing out again on the current offer. In other words, they might think that the present offer is similar and already anticipate the regret that might be associated with missing out for a second time. This type of anticipation might lead to differential effects depending on the individual's assessment orientation. It

could be expected that individuals with high (vs. low) assessment orientations exhibit anticipated regret more strongly, given that they generally experience regret more strongly (Pierro et al., 2008); that is, assessors might be particularly motivated to avoid regret about the “double whammy” (missing out on two attractive opportunities in a row—the small missed one and the present one). This might explain why individuals with a high (vs. low) assessment orientation are more likely to act on the present offer after missing a small (vs. large) one. However, emergent regulatory mode research casts doubt on this explanation. Anticipated regret might not be expressed more strongly by assessors, given that individuals with strong locomotion orientations exhibit a stronger orientation to the future, while no such association could be found for assessment (Kruglanski, Pierro & Higgins, 2016).

Based on the extant literature, we could not conclusively distinguish between the above alternative explanations and our proposal. Our proposal suggests that assessors are simply motivated by calculations of value. Accordingly, once we establish the key hypothesized effects in Study 1 for experimental inductions of Assessment, and individual differences of Assessment in Study 2 and 3, a test of the competing explanations is provided in the last study of this research (Study 4).

### **Study 1: Assessment Primes and Missing Out on a Holiday**

In this first study we seek to test the interaction of missed opportunity size with assessment orientations using a priming method. With an experimental manipulation, rather than measuring chronic assessment dispositions, we can draw stronger causal inferences.

#### **Method**

**Participants.** Ninety-two undergraduate students from an Australian university (53 women,  $M_{\text{age}} = 20.8$  years,  $SD = 3.9$ ) participated in the study in return for course credit. A total of 50 participants indicated being born in Australia, while 42 were born abroad. In order to determine statistical power a priori we turned to inaction inertia research (Funder et al., 2014). Previous research in this area has typically reported medium- to large-effect sizes

(e.g., van Putten et al., 2009), so we sought to include at least 20–25 participants in each of the four conditions to ensure sufficient power.

**Procedure.** We used a  $2 \times 2$  (assessment versus locomotion prime; large versus small missed opportunity) design. For the assessment and locomotion primes we used an established procedure (Avnet & Higgins, 2003) that asked participants to recall and write down instances in which they acted either like assessors or like locomotors. Next, we presented participants with an established inaction inertia scenario (Tykocinski & Pittman, 2001; Tykocinski et al., 1995). The scenario asked participants to imagine that they wanted to make a purchase (i.e., book a holiday). As part of this purchase there was an attractive opportunity available (book a holiday and get a free gift), taking different forms (e.g., small missed opportunity = a toiletry bag; large missed opportunity = a toiletry bag and two suitcases) (Tykocinski & Pittman, 2001; Tykocinski et al., 1995). The scenario also stated that the participants had missed this purchase opportunity (the offer had expired).

**Measures.** Next, participants were asked to indicate how likely they would be to make another, less attractive purchase (book a holiday without any gift). Their responses provided our dependent variable (“Please indicate how likely you would be to join the tour”:  $1 = \text{Definitely would not join}$  to  $7 = \text{Definitely would join}$ ). The participants also indicated how much they would regret having missed out on the first opportunity (“Please indicate how much you would regret that you missed out on the [two elegant suitcases and a matching] toiletry bag”:  $5 = \text{No regret}$  to  $5 = \text{Very much regret}$ ) (Wong & Kwong, 2007). Finally, they answered some standard demographic questions and were debriefed.

## Results and Discussion

**Purchase likelihood.** Next, we performed a  $2 \times 2$  (small or large missed opportunity; assessment or locomotion prime) between-participants ANOVA, with likelihood of

purchasing the holiday as the dependent variable. This analysis revealed a significant effect of the size of the missed opportunity; participants in the small missed opportunity group were more likely to purchase the holiday than participants in the large missed opportunity group ( $M_{\text{difference}} = 2.74$ ,  $SE = .44$ ,  $F(1, 88) = 170.83$ ,  $p < .001$ ,  $\eta^2 = .31$ , 95% confidence interval: 1.88 to 3.60). The assessment (vs. locomotion) prime had no effect ( $F(1, 88) = 0.17$ ,  $p = .90$ ,  $\eta^2 < .001$ ).

Importantly, however, we did find a significant effect of the interaction between the missed opportunity size and an assessment versus locomotion prime ( $F(1, 88) = 37.14$ ,  $p = .004$ ,  $\eta^2 = .09$ ); that is, as shown in Figure 1, though the size of the missed opportunity was significant in both the assessment and locomotion prime conditions, its effect was even stronger in the assessment prime condition ( $M_{\text{difference}} = 4.02$ ,  $SE = .61$ ,  $F(1, 88) = 43.02$ ,  $p < .001$ ,  $\eta^2 = .33$ , 95% confidence interval: 2.80 to 5.23) than in the locomotion condition ( $M_{\text{difference}} = 1.46$ ,  $SE = .62$ ,  $F(1, 88) = 5.61$ ,  $p = .02$ ,  $\eta^2 = .06$ , 95% confidence interval: .24 to 2.69). As predicted in H1, people with a strong assessment orientation were more sensitized to the size of the missed opportunity than those with a strong locomotion orientation. From another angle, priming assessment (vs. locomotion) had a positive effect in the large missed opportunity condition ( $M_{\text{difference}} = 1.33$ ,  $SE = .63$ ,  $F(1, 88) = 4.51$ ,  $p = .04$ ,  $\eta^2 = .05$ , 95% confidence interval: 0.09 to 2.76) and a negative effect in the small missed opportunity condition ( $M_{\text{difference}} = -1.22$ ,  $SE = .60$ ,  $F(1, 88) = 4.13$ ,  $p = .045$ ,  $\eta^2 = .05$ , 95% confidence interval: -2.4 to -.03).

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Insert Figure 1 about here

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### Study 2: Chronic Assessment Orientations

The results of Study 1 showed strong support for our first hypothesis (H1). However, we could not distinguish whether the sensitivity to the size of the missed opportunity arose because heightened assessment increased sensitivity, heightened locomotion decreased sensitivity, or higher assessment than locomotion increased sensitivity. To address this limitation, in Study 2 we measured the strength of chronic assessment locomotion orientations, which allowed us to study the effects of differences in assessment orientation, differences in locomotion orientation, and a difference score between the two orientations, as well as any possible locomotion–assessment interaction.

## Method

**Participants.** Sixty-five native English-speakers located in the United States were recruited from an online panel and participated for \$1 each (36 men,  $M_{\text{age}} = 33.6$ ,  $SD = 10.9$ ). We expected individual differences in regulatory mode orientation to be greater than those induced by priming (i.e., ceiling effects exist when exposing people who already have strong assessment orientations to an assessment prime). As such, we aimed to include approximately 30 participants per condition.

**Procedure.** We used the same inaction inertia scenario as in Study 1, involving small and large missed opportunity conditions.

**Measures.** Measurement of the dependent variable—purchase likelihood—was identical to Study 1. To measure the participants' regulatory mode orientations we used the established locomotion and assessment scales (Kruglanski et al., 2000). The scales each contain two, 12-item self-reported measures, designed to assess individual differences of locomotion and assessment. The locomotion ( $\alpha = .86$ ) and assessment ( $\alpha = .88$ ) scales were not correlated ( $r = .12$ ,  $p = .34$ ). Again, the study concluded with demographic questions and a debriefing.

## Results and Discussion



We tested our prediction about the effect of the interaction between an assessment orientation and missed opportunity size on purchase likelihood using a linear regression analysis. The main effect of (A) missed opportunity size (small missed opportunity = 0, large missed opportunity = 1) and (B) assessment (according to Kruglanski et al., 2000; mean centered:  $M_{\text{Assessment}} = 3.26$ ), as well as their interaction ( $A \times B$ ), were entered into a linear regression analysis. In a second step, we replaced assessment with locomotion to investigate whether locomotion might desensitize individuals to the size of a missed opportunity (Kruglanski et al., 2000; mean centered:  $M_{\text{Locomotion}} = 3.69$ ). In the third step, we looked at assessment predominance over locomotion as a potential moderator, computed by subtracting locomotion from assessment (Higgins, Pierro, & Kruglanski, 2008; mean centered:  $M_{\text{Assessment-Locomotion}} = -.43$ ). Finally, in the fourth step, we investigated the three-way interaction between assessment, locomotion, and missed opportunity size. Table 1 provides an overview of these analyses.

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Insert Table 1 about here

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The results from the first step yielded a negative, significant effect for the size of the missed opportunity on the likelihood of purchase ( $\beta = -1.62$ ;  $t_{(61)} = -3.19$ ,  $p = .002$ ) that replicated Study 1 and previous literature. We also found a marginally significant main effect of assessment strength ( $\beta = .94$ ;  $t_{(61)} = 1.74$ ,  $p = .09$ ), qualified by the predicted two-way interaction between assessment strength and small versus large missed opportunity ( $\beta = -1.57$ ;  $t_{(61)} = -2.23$ ,  $p = .03$ ). As shown in Figure 2, strong assessors during the present purchase were much more sensitive to the size of the missed opportunity than were weak assessors.

Insert Figure 2 about here

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To explore the interaction, we used the Johnson-Neymann (J-N) “floodlight” approach that Spiller, Fitzsimons, Lynch, and McClelland (2013) recommend and used the SPSS script from Hayes (2012). A larger missed opportunity significantly decreased purchase likelihood for individuals with an assessment level of 2.94 ( $\beta_{\text{JN}} = -1.11$ ,  $SE = .56$ ,  $p = .05$ ;  $M_{\text{Assessment}} = 3.26$ ,  $SD_{\text{Assessment}} = .74$ ) or higher, but not for individuals with an assessment level that was lower. This provided further support for H1 and is consistent with Study 1, which showed that, unlike participants with a high locomotion orientation (i.e., not a high assessment orientation), those with a high assessment orientation reacted stronger to a large rather than small missed opportunity.

Step 2 again yielded a significant effect for the size of the missed opportunity on the likelihood of purchase ( $\beta = -1.55$ ;  $t_{(61)} = -3.02$ ,  $p = .004$ ). We also found a positive direct effect of locomotion ( $\beta = 1.33$ ;  $t_{(61)} = 2.08$ ,  $p = .04$ ).<sup>1</sup> Importantly, however, there was no interaction between locomotion and the size of the missed opportunity ( $\beta = -1.39$ ;  $t_{(61)} = -1.51$ ,  $p = .14$ ).

In the third step increases in missed opportunity size again had a negative effect on the likelihood of purchase ( $\beta = -1.58$ ;  $t_{(61)} = -3.02$ ,  $p = .004$ ), while neither assessment vs. locomotion predominance ( $\beta = -.01$ ;  $t_{(61)} = -.03$ ,  $p = .98$ ), nor its interaction with missed opportunity size showed a significant effect ( $\beta = -.53$ ;  $t_{(61)} = -.88$ ,  $p = .38$ ).

Finally, in the fourth step we entered assessment, locomotion, their interaction with missed opportunity size, the interaction between locomotion and assessment, as well as the three-way interaction between locomotion, assessment, and missed opportunity size. We again found a negative effect of missed opportunity size ( $\beta = -1.47$ ;  $t_{(57)} = 2.88$ ,  $p = .01$ ), a positive effect of locomotion ( $\beta = 1.38$ ;  $t_{(57)} = 2.18$ ,  $p = .03$ ), and a marginal main effect for

assessment ( $\beta = 1.00$ ;  $t_{(57)} = 1.85$ ,  $p = .07$ ). The two-way interaction between assessment and small versus large missed opportunity remained significant ( $\beta = -1.70$ ;  $t_{(57)} = -2.40$ ,  $p = .02$ ). We did not find an interaction effect between locomotion and size of the missed opportunity ( $\beta = -1.17$ ;  $t_{(57)} = -1.28$ ,  $p = .20$ ), locomotion and assessment ( $\beta = -.12$ ;  $t_{(57)} = .87$ ,  $p = .89$ ), or a three-way interaction ( $\beta = -.42$ ;  $t_{(57)} = 1.06$ ,  $p = .69$ ).

### Study 3: Missing out on Fitness Center Enrollment

Studies 1 and 2 provided strong evidence for the notion that individuals with strong (vs. weak) assessment orientations neglect an offer in the present after a large (vs. small) opportunity has been missed. This was tested in the context of a missed opportunity for a holiday, which is highly realistic given the prevalence of time-based deals on platforms such as Kayak or Expedia. In order to ensure the generalizability of this finding, Study 3 aimed to replicate this finding in the context of fitness center enrollments, similar to a restricted “one time only” offer on a platform such as Groupon.

#### Method

**Participants.** Forty-eight students from a Dutch university (25 men,  $M_{\text{age}} = 23.9$ ,  $SD = 1.5$ ) participated for course credit. We arrived at this number by setting a goal of including approximately 20–25 participants per condition. Of the respondents, 22 were born in Germany, 13 in the Netherlands, and 12 elsewhere.

**Procedure.** The experiment started with an established inaction inertia scenario (Tykocinski et al., 1995). Unlike Studies 1 and 2, however, to increase the generalizability of our findings the purchase decision referred to a different setting (joining a fitness center; small missed opportunity = 25-minute commute to fitness center; large missed opportunity = 5-minute commute) (Tykocinski & Pittman, 2001; Tykocinski et al., 1995). The scenario stated that participants missed this opportunity (membership rolls closed), but another, less attractive offer was presented (joining a fitness center that requires a 30-minute commute).

**Measures.** Participants' likelihood to act on the second opportunity provided our dependent variable ("Would you join this second fitness center?": 1 = *Definitely would not join* to 7 = *Definitely would join*). Perceived opportunity difference was measured by asking participants to indicate the degree to which "the missed and the present offers are alike" (1 = *Not at all alike* to 11 = *Very much alike*). Next, we measured locomotion ( $\alpha = .73$ ) and assessment ( $\alpha = .78$ ) orientations using the same scale as in Study 2. In this study, the two scales were significantly and positively correlated ( $r = .34, p = .02$ ). The experiment concluded with standard demographic questions and a debriefing of participants.

## Results and Discussion

To replicate our findings from Study 2 we tested our prediction about the effect of the interaction between assessment orientation and the size of the missed opportunity on purchase likelihood, using a linear regression analysis. The main effects of (A) the size of the missed opportunity (small = 0, large = 1) and (B) assessment (Kruglanski et al., 2000; mean centered:  $M_{\text{Assessment}} = 3.37$ ), along with their interaction ( $A \times B$ ), were entered in a linear regression analysis. The results showed a significant effect of the size of the missed opportunity on purchase likelihood ( $\beta = -2.48; p < .001$ ), replicating our findings from Studies 1 and 2 as well as previous literature. There was no effect of assessment ( $\beta = 1.33; t_{(44)} = 1.31, p = .20$ ). Importantly, we replicated the significant two-way interaction between strength of assessment and small versus large missed opportunity ( $\beta = -2.44; t_{(44)} = -2.04, p = .047$ ).

Larger missed opportunities had a significant negative effect on purchase likelihood for individuals with an assessment level of 2.97 ( $\beta_{\text{JN}} = -1.50, SE = .75, p = .05; M_{\text{Assessment}} = 3.37, SD_{\text{Assessment}} = .51$ ) or higher, but not for individuals with an assessment level that was lower (see Figure 3). This provided further support for H1 and is in line with Studies 1 and 2.

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Insert Figure 3 about here

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#### Study 4: Field Study

Study 4 tested whether the observed sensitivity to the size of a missed opportunity among high assessment individuals would generalize to consequential decisions. The study was set in the context of a missed opportunity to earn a bonus on a crowdsourcing platform (like when Uber drivers miss out on surge pricing), rather than, as in Studies 1, 2 and 3, a missed purchase opportunity. Furthermore, we were also interested in the mechanism behind the effect found in Study 1-3. We propose that comparing a small missed opportunity with an offer that is still available should result in a more favorable value judgment for the present offer relative to a large missed opportunity (e.g., “This offer is actually also quite valuable”). These changes of value judgments in turn should result in corresponding variance of present offer acceptance and thereby explain the effects we found in Studies 1 to 3. This theory was tested against alternative mechanisms based on (1) perceptions of differences between the missed and present offer, (2) experienced regret, and (3) anticipated regret.

#### Method

**Participants.** Fifty-eight English-speaking crowdsourcing workers from the United States participated (34 men,  $M_{\text{age}} = 34.8$ ,  $SD = 10.2$ ). In line with our previous studies we aimed to include approximately 30 participants per experimental condition.

**Procedure.** Workers signed up for an assignment with three parts. They were informed that high performance in the first part would result in a higher pay rate (i.e., a bonus) for mini tasks to be completed in the second part. This bonus was missed due to the high performance requirement. Workers were randomly assigned to a potential bonus that varied from \$0.02 to

\$0.16 extra for each mini task, on top of the standard minimum 10 cents per mini task they would earn in either case. Furthermore, they learned that the number of mini tasks they would complete in part two was up to them. Finally, it was communicated that the third part would pay \$1 for all workers.

In the first part workers had to identify the cheapest product in terms of ounce per dollar from four options. An example is provided below:

1. Barilla – 14.5 oz. – \$ 2.59 (correct option)
2. Bionaturae – 16 oz. – \$ 3.29
3. Felicia – 12 oz. – \$ 2.69
- 4 De Cecco – 13.2 oz. – \$ 2.69.

Workers were informed they would get the bonus only if they found the correct option across ten of the ten presented categories within 2 minutes. In our sample all workers failed the task. Thus, all workers missed out on a bonus that varied between 2 and 16 cents per mini task.

Next, at the start of the second part, we measured our dependent variable “Please indicate below how many mini tasks you would like to complete” without the bonus. They could choose between 1 and 10. Following this, we measured the mediator, value judgments of the payment for mini tasks in the second part ( $\alpha = .91$ ) using a two-item, 7-point scale (“Please indicate how well the words beside the checkboxes describe how you feel about the payment for mini tasks in the next part”: *unappealing – appealing, undesirable – desirable*). Perceived opportunity difference ( $\alpha = .88$ ) was measured using a three-item, 11-point scale (“Please indicate how much the missed payment rate for each mini task is alike/ indistinguishable/ interchangeable to the actual rate you will receive”: 1 = *Not at all* to 11 = *Very much*). Finally, anticipated and experienced regret were measured (“Please indicate how much you regret that you missed out on the bonus payment for the mini tasks/Please indicate

how much you would regret missing out on the actual payment rate for the mini tasks”: -5 = *No regret* to 5 = *Very much regret*) (Wong & Kwong, 2007). Following, workers were assigned to mini tasks they had agreed to complete before. These were similar to the task described in part one, but easier, as only one high and one low-value product option were presented for each category and no time limit was enforced.

In the third part, all workers completed the locomotion ( $\alpha = .87$ ) and assessment ( $\alpha = .84$ ) scale as in Studies 2 and 3 ( $r = .05, p = .71$ ). Finally, demographic questions were collected. We also measured household income as a control variable (“What is your approximate annual household income?”: 0 = \$0–100,000; 1 = \$100,000+).

## Results and Discussion

**Number of mini tasks performed.** We tested our prediction about the interaction effect between assessment orientation and the size of the missed bonus on the number of mini tasks performed, using a linear regression analysis. The main effects of (A) the size of the missed bonus and (B) assessment (Kruglanski et al., 2000; mean centered:  $M_{\text{Assessment}} = 3.23$ ), along with their interaction ( $A \times B$ ), were entered in a linear regression analysis. The results showed a significant effect of the size of the missed opportunity on the number of mini tasks performed ( $\beta = -.26, t_{(51)} = -2.19, p = .03$ ). There was also a marginal effect of assessment ( $\beta = 3.83; t_{(51)} = 1.97, p = .05$ ). Individuals with a stronger assessment orientation were generally more likely to complete mini tasks. Importantly, we also found a significant two-way interaction between strength of assessment and small versus large missed opportunities ( $\beta = -.48; t_{(51)} = -2.33, p = .02$ ).

As Figure 4 depicts, a larger missed opportunity had a significant negative effect on the number of mini tasks performed for workers with an assessment level of 3.20 ( $\beta_{\text{JN}} = -.24, SE = .12, p = .05; M_{\text{Assessment}} = 3.23, SD_{\text{Assessment}} = .66$ ) or higher, but not for individuals with an assessment level that was lower. This provides further support for H1 and is in line with

Studies 1, 2, and 3.

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Insert Figure 4 about here

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**Value judgments.** Next, we tested for an interaction effect between missed opportunity size and assessment on value judgments (see model 1, Table 2). We entered the main effects of (A) missed opportunity size and (B) assessment, together with their interaction ( $A \times B$ ), in a linear regression analysis. The results illustrated a significant effect on value judgments for missed opportunity size ( $\beta = -.11$ ;  $t_{(51)} = -2.46$ ,  $p = .02$ ) and assessment ( $\beta = 1.92$ ;  $t_{(51)} = -2.63$ ,  $p = .01$ ). More importantly, we found a significant two-way interaction between strength of assessment and missed opportunity size ( $\beta = -.19$ ;  $t_{(51)} = -2.63$ ,  $p = .01$ ). Income did not affect value judgments ( $\beta = -.59$ ,  $t_{(51)} = -.66$ ,  $p = .51$ ).

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Insert Table 2 about here

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As Figure 5 depicts, there was a significant, negative effect of larger missed opportunity size on purchase likelihood for individuals with an assessment level of 3.14 ( $\beta_{JN} = -.09$ ,  $SE = .04$ ,  $p = .05$ ;  $M_{\text{Assessment}} = 3.23$ ,  $SD_{\text{Assessment}} = .66$ ) or higher, but not for individuals with an assessment level that was lower. This provides support for H2: Participants with strong (*vs.* weak) assessment orientations are more likely to devalue a present opportunity after missing out on a large one.

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Insert Figure 5 about here

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**Conditional indirect effects.** We also investigated the potential mediating role of value judgments (H3) as well as perceived opportunity difference, experienced regret and



anticipated regret using a bootstrapping analysis with the PROCESS macro for SPSS (Model 8) (Hayes, 2012). The results in Table 2 reflect five multiple regression models. In the first model we regressed the proposed mediator (value judgments) on missed opportunity size (A), assessment (B), and their interaction ( $A \times B$ ). We also controlled for income. In the second, third, and fourth models we repeated this for perceived opportunity difference, experienced regret, and anticipated regret as dependent variables respectively. Finally, in the fifth model we regressed the dependent variable (number of mini tasks performed) on missed opportunity size as the independent variable (A), assessment as the moderator (B), their interaction ( $A \times B$ ), value judgments (M1), perceived opportunity difference (M2), experienced regret (M3), and anticipated regret (M4). In line with our predictions and as discussed previously there was a significant interaction effect of missed opportunity size and assessment on value judgments ( $\beta = -.19$ ;  $t_{(51)} = -2.63$   $p = .01$ , see model 1).

There was no such interaction effect for perceived opportunity difference, for experienced regret, or for anticipated regret (see Models 2–4 in Table 2).

Importantly, Model 5 showed that when including value judgments, the interaction effect of missed opportunity size and assessment on the number of mini tasks performed became insignificant ( $\beta = -.36$ ;  $t_{(47)} = -1.67$ ,  $p = .10$ ). The effect of value judgments on the number of mini tasks performed was significant in this final model ( $\beta = .90$ ;  $t_{(47)} = 2.17$ ,  $p = .04$ ), while the effects of perceived opportunity difference, experienced regret, anticipated regret, and income were not (see Table 2).

Finally, only the 95% confidence interval for the conditional indirect effect through value judgments excluded zero (95% confidence interval:  $-.44$  to  $-.03$ ) indicating statistically significant mediation. As expected, the indirect effect of missed opportunity size through value judgments was significant and negative for high assessment orientation levels (95% BC

confidence interval: -.52 to -.05) but did not reach significance for low levels. Study 4 thus supported H3: Differential value judgments explain why individuals with strong (*vs.* weak) assessment orientations neglect offers in the present after a large (*vs.* small) opportunity has been missed.

The 95% confidence intervals for the conditional indirect effect through perceived opportunity difference (-.07 to .09), experienced regret (-.08 to .46), and anticipated regret (-.24 to .15) all included 0. Thus, none of the alternative accounts were supported.

### General Discussion

The popularity of digital platforms such as Groupon, eBay, and Uber, which provide short-term offers, has increased the prevalence of attractive opportunities to spend or to earn money that are easy to miss. In this research we propose that people's assessment orientation sensitizes them to the size of missed opportunities. Individuals with a strong assessment orientation are more likely to reject a present offer after missing a large initial opportunity, and are more likely to accept a present offer after missing out on a small opportunity. This finding informs the previous literature that has found that a large missed opportunity can decrease the acceptance of a present offer (Arkes et al., 2002; Kumar, 2004; Pittman et al., 2008; Tsiros, 2008; Tykocinski, & Pittman, 1998; Tykocinski et al., 1995; van Putten et al., 2007, 2008, 2009; Zeelenberg et al., 2006). Numerous studies suggest that the effect of a missed opportunity is largely motivated by its size (Tykocinski & Pittman, 2001; Tykocinski et al., 1995; van Putten et al., 2014). The present research identifies one motivational factor underlying when, for whom, and why the *size* of the missed opportunity matters: Strength of an individual's assessment orientation. Empirical results across the four studies presented in this research reveal that participants with strong assessment orientations are particularly sensitive to the size of a missed opportunity. This sensitivity influences their acceptance of

follow-up offers, and this is the case for both a momentarily strong assessment orientation induced in a current situation and a chronically strong assessment orientation as a stable personality disposition.

The importance of the interaction between missed opportunity size and assessment also highlights the need to understand the process by which this interaction affects action on a present offer. As we found in Study 4, a large missed opportunity decreases the judged value of a present offer more for individuals with a strong assessment orientation, which in turn results in the neglect of the present offer. This devaluation process explains why assessors are less likely to accept an opportunity in the present after missing out on a large opportunity.

Beyond contributing to research on the effects of missed opportunity size, our findings extend and highlight the importance of the regulatory mode theory for understanding decision-making. Our studies and findings contribute to this theory by extending current knowledge on assessment orientation. In line with Kruglanski et al.'s (2000, p. 794) definition of assessment, established regulatory mode research shows that people with strong assessment orientations exhibit greater motivation to engage in critical comparisons across different current offers (Avnet & Higgins, 2003; Mathmann et al., in press). We extend this literature by illustrating that assessors' orientations to compare also extend to situations in which they confront a single offer and must make comparisons between this offer available in the present and an opportunity *from the past*. Therefore, this research shows that assessment effects are not limited to making comparisons in the present among multiple current offers but also apply to comparisons between present and past opportunities to accept an option. Regulatory mode theory emphasizes that locomotion and assessment are two separate regulatory mechanisms that can function independently (Kruglanski et al., 2000). Because of this independence, the present research shows that, for specific decisions that involve comparisons across time, a strong assessment orientation can impact decision-making in the

present as a function of a past opportunity, while a strong locomotion orientation has no effect.

### **Further Research**

Further research should consider how assessment and locomotion orientations affect decision-making more broadly. While assessment likely predominates in considerations of past reference points, locomotion orientations may become more relevant when *future* actions are the focus, given that there is substantial evidence that individuals with a strong locomotion orientation are more likely to self-regulate in terms of the future than individuals with a strong assessment orientation (Kruglanski et al., 2016). The shopping momentum effect is a particularly good example here because it predicts that an initial purchase increases the likelihood of a second, unconnected purchase (Dhar, Huber, & Khan, 2007). Individuals who want to move from one state to the next (locomotion) should be motivated to progress to the second purchase, and the tendency to make comparisons might be less relevant. Thus, investigating the effects of the two regulatory mode orientations separately across different decision scenarios can provide more nuanced pictures of the boundary conditions and mechanisms that underlie some well-established decision-making biases.

### **Implications**

Our finding that people's assessment orientations sensitize them to the size of a missed opportunity has interesting implications for a variety of contexts. In a customer context, for example, the role of assessment orientations in post-promotion decision-making is particularly relevant. People might not always have time to act on exceptional deals or might notice discounts only after the sale ends. Our research suggests that, in these situations, communications that prompt individuals' assessment orientation are likely to decrease purchases, which should be a concern for managers. In terms of public policy that seeks to prevent unhealthy behaviors, our results may also offer new ways to limit consumption of

vice products such as alcohol or tobacco. Our findings can help marketers and policy-makers match their potential interventions related to small and large missed opportunities to individual differences in assessment orientations; that is, they offer a means to manage behavior through situational induction of an assessment orientation. On the other hand, in an on-demand work context, presenting workers with an exceptional work opportunity that is likely to be missed should be avoided for high assessment individuals, as this can affect their motivation to take on subsequent work.

## Footnotes

<sup>1</sup>A main effect of locomotion was not found in Studies 1, 3, or 4. These divergent findings might be explained by sample differences. For Americans from an online panel, a holiday in Thailand might represent a lot of change, resulting in increased purchase likelihood for individuals with high locomotion orientations. Since Australian undergraduates might be more familiar with the notion of traveling to Thailand locomotion might not have such an effect in the Australian sample. We did not investigate these possibilities further as the main focus of the current research is sensitivity to the size of a missed opportunity, rather than increased purchase likelihood in general.

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**Table 1**

*Effect of Missed Opportunity Size on Purchase Likelihood Conditional on Assessment (1),  
Locomotion (2), Assessment-Locomotion (3), Assessment  $\times$  Locomotion (Study 2)*

DV = Purchase likelihood	(1) <i>Assessment</i>	(2) <i>Locomotion</i>	(3) <i>Assessment- Locomotion</i>	(4) <i>Assessment <math>\times</math> Locomotion</i>
Intercept	5.63***	5.54***	5.62***	5.55***
Missed opportunity size	-1.62**	-1.55**	-1.58**	-1.47**
Assessment	.94 <sup>†</sup>	—	—	1.00 <sup>†</sup>
Locomotion	—	1.33*	—	1.38*
Assessment – Locomotion	—	—	-.01	—
Missed opportunity size $\times$ Assessment	-1.57*	—	—	-1.71*
Assessment $\times$ Locomotion	—	—	—	-.12
Missed opportunity size $\times$ Locomotion	—	-1.39	—	-.12
Missed opportunity size $\times$ Assessment - Locomotion	—	—	-.53	—
Missed opportunity size $\times$ Assessment $\times$ Locomotion	—	—	—	-.42

<sup>†</sup>Significant at the 10% level.

\*Significant at 5% level.

\*\*Significant at 1% level.

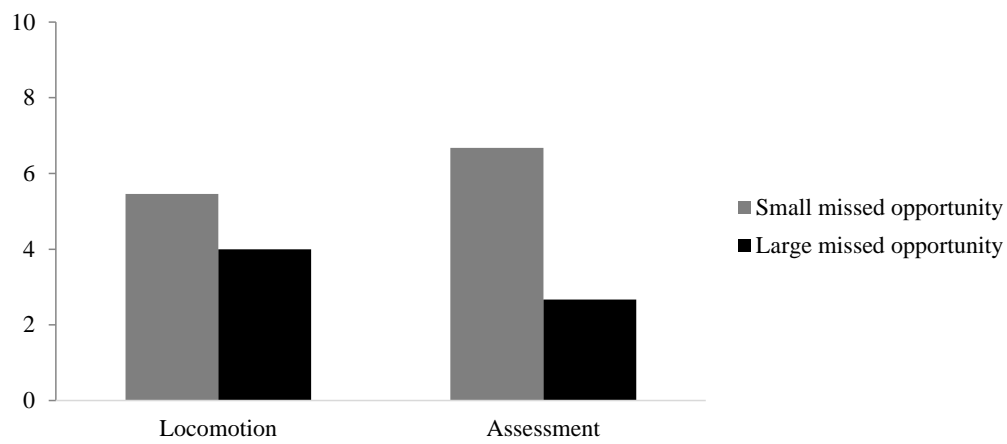
\*\*\*Significant at the .1% level.

**Table 2**

*Interaction Effect between Missed Opportunity Size and Assessment on Value Judgments, Alternative Mediators and Number of Mini Tasks Performed (Study 4)*

1. DV = Value judgment	Model 1					
	$\beta$	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Intercept	6.40	.42	15.12	.00	5.55	7.25
Missed opportunity size	-.11	.04	-2.46	.02	-.19	-.02
Assessment	1.92	.70	2.76	.01	.52	3.32
Missed opportunity size $\times$ A	-.19	.07	-2.63	.01	-.34	-.05
Income	-.59	.90	-.66	.51	-2.39	1.21
2. DV = Perceived opportunity difference	Model 2					
	$\beta$	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Intercept	6.83	.72	9.50	.00	5.39	8.27
Missed opportunity size	-.21	.07	-2.83	.01	-.35	-.06
Assessment	-.68	1.18	-.58	.57	-3.06	1.69
Missed opportunity size $\times$ A	.01	.13	.75	.46	-.16	.35
Income	-2.21	1.52	-1.45	.15	-5.26	.85
3. DV = Experienced regret	Model 3					
	<i>B</i>	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Intercept	6.86	.75	9.15	.00	5.38	8.41
Missed opportunity size	.16	.08	2.13	.04	.01	.32
Assessment	1.86	1.24	1.50	.14	-.63	4.35
Missed opportunity size $\times$ A	-.08	.13	-.60	.55	-.43	.19
Income	.02	1.59	.01	.99	-3.18	3.22
4. DV = Anticipated regret	Model 4					
	$\beta$	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Intercept	7.29	.90	8.08	.00	5.48	9.11
Missed opportunity size	.08	.09	.84	.41	-.11	.26
Assessment	1.58	1.49	1.07	.29	-1.40	4.56
Missed opportunity size $\times$ A	-.01	.16	-.04	.97	-.32	.31
Income	-2.15	1.91	-1.12	.27	-5.98	1.69
5. DV = Number of mini tasks performed	Model 5					
	$\beta$	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Intercept	3.56	3.30	1.08	.29	-3.09	10.21
Value judgment	.90	.41	2.17	.04	.06	1.73
Perceived opportunity difference	.02	.24	.09	.93	-.47	.51
Experienced regret	-.75	.48	-1.57	.12	-1.71	.21
Anticipated regret	.54	.38	1.44	.16	-.22	1.30
Missed opportunity size	-.08	.14	-.58	.56	-.36	.20
Assessment	2.64	2.02	1.31	.20	-1.42	6.72
Missed opportunity size $\times$ A	-.36	.22	-1.67	.10	-.80	.07
Income	4.53	2.57	1.76	.09	-.65	9.70

*Note.* A = Assessment; LLCI = lower limit confidence interval; ULCI = upper limit confidence interval



*Figure 1.* Purchase likelihood as a function of assessment and locomotion prime conditions and missed opportunity size, Study 1.

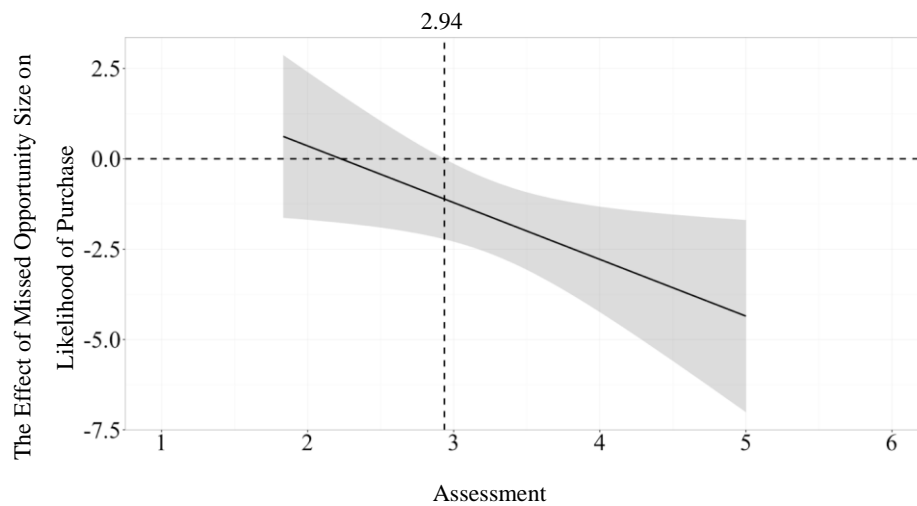


Figure 2. Purchase likelihood as a function of assessment orientations and missed opportunity size, Study 2.

Notes: The graph is based on a floodlight analysis (Spiller et al., 2013) and illustrates the effect of missed opportunity size on the purchase likelihood for any assessment value. The shaded area represents confidence intervals and the J-N point is obtained at assessment = 2.94 ( $p=.05$ ).

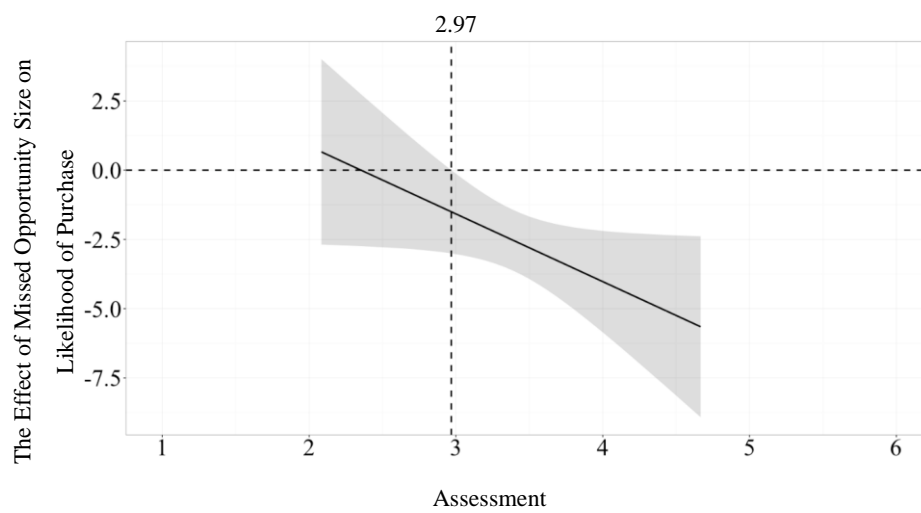


Figure 3. Purchase likelihood as a function of assessment orientations and missed opportunity size, Study 3.



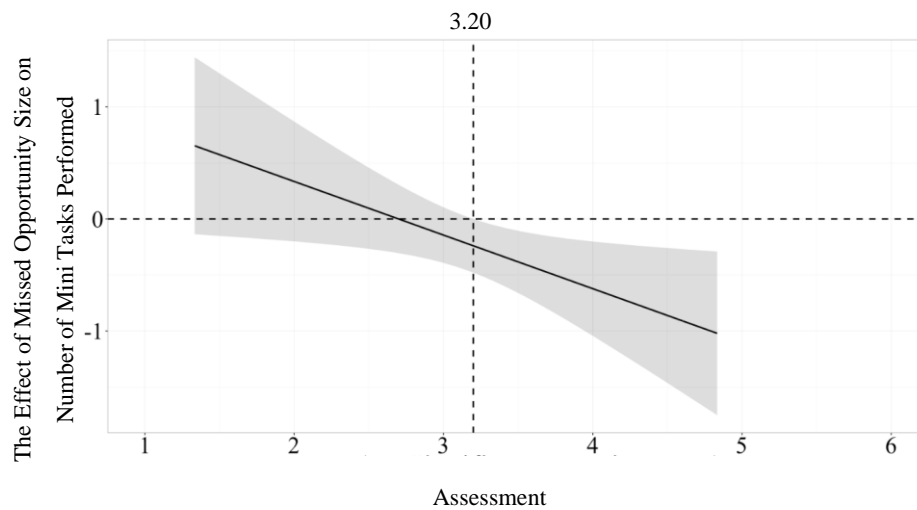


Figure 4. Number of mini tasks performed as a function of assessment orientations and missed opportunity size, Study 4.

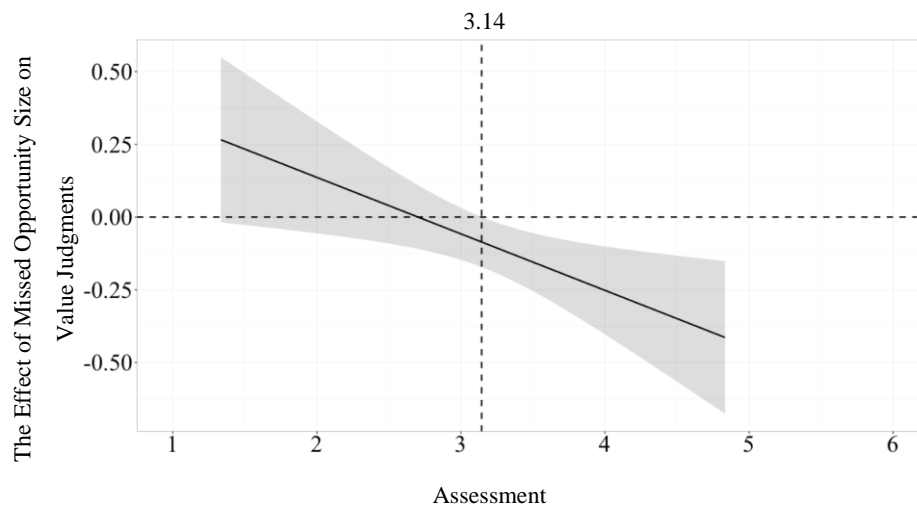


Figure 5. Value judgments as a function of assessment orientations and missed opportunity size, Study 4.